

HYSTERICAL PARALYSIS

Abraham Myerson, M.D., Boston

The group of cases presented have a physiology or, at any rate, a physiologic psychology which, once understood, opens the doors to a rapid cure. But unless their mechanism of disability is understood the patients may be markedly incapacitated and wander from physician to physician vainly seeking help.

Case No. 1

K. W., a man, aged 22, single, a salesman, whose early history was entirely negative, was playing football eight weeks before being seen and was knocked unconscious for one and one-half hours and was hazy the next day. In the hospital to which he was taken, it was stated that there was a fracture of the first lumbar vertebrae. He stated that both legs felt paralyzed and anesthetic at first. The anesthesia of both legs remained for some time; then that of the left entirely disappeared and the right improved but had remained more or less anesthetic ever since.

Physical examination was entirely negative except for the right leg. The knee jerks on both sides were lively and equal. Ankle jerks were lively and equal. There was no Babinski reflex. There was almost complete anesthesia below the right knee. The anesthesia ran circularwise around the leg in typical hysterical fashion. As he attempted to lift the leg, the muscles on both sides of the thigh contracted violently; that is, the quadriceps contracted vigorously, as did the flexors. The toes were moved but slightly. The wrong flow of power was distinctly evident; that is to say, when the attempt was made to raise the leg from the table, the agonist and antagonist were contracted. This set up a deadlock between the two groups of muscles and, naturally, motion became impossible.

The immediate psychogenesis of the situation seems simple enough. There was undoubtedly some cord injury at first, which set up a numbness of the legs and weakness. This disappeared but left behind it a state of fear and one of amnesia for the proper use of the muscles of the legs. This condition was explained to the patient. He was told that he would be able to walk when he left the office. A powerful electric current was given to the muscles of the front of the leg. They contracted vigorously. This continued for a few minutes. The patient was told to watch the muscles contract, and it was stated to him that he must try to help the electric current and contract the muscles with each stimulation. In a short time the current was discontinued surreptitiously, and the patient continued to move his leg with no electrical stimulation. Shortly thereafter he was able to move his leg perfectly well and walked out of the office with no drag whatever to his leg.

Case No. 2

A housewife, aged 35, also demonstrated that traumatic hysteria may be genuine and that the patient suffering from such a condition may make an honest effort to get well. The patient was seen Dec. 5, 1934. A year before she was in an automobile accident. The car in which she was riding tipped over and all the passengers fell out in a heap. She was not rendered unconscious but was shaken, bruised and cut. She was out of bed in two days but noticed that the right arm commenced to shake. This continued, grew worse, and reached the stage at which she could not use the hand for writing or for

SOME DERMATOLOGICAL ASPECTS OF PHYSICAL THERAPY

Maximilian E. Obermayer, M.D.

Electrolysis

This time-honored device has been used extensively and successively in dermatological practice. In contrast to iontophoresis, surgical electrolysis is enjoying a great popularity. It is used with a needle as active electrode for the destruction of small benign growths and blood vessels, and for the permanent removal of superfluous hair. The advantage of the method is its comparative painlessness which allows us to destroy dilated cutaneous vessels (telangiectasis), (for example, in hypertrophic rosacea without the use of an anesthetic) and the surprisingly small defects which are produced by its destructive action. If the least noticeable scar is the paramount consideration in the removal of a small non-consequential lesion, electrolysis may be considered the method of choice. The greatest value of electrolysis, however, and its widest use is that for epilation, the permanent removal of superfluous hair.

In treating superfluous hair of the face, practical considerations play a very important part. First of all, the selection of the case is important. The operator who takes on indiscriminately for electrolysis any patient who requests the removal of hair is bound to come to grief quite soon. Not all hair is suitable for electrolysis since the resulting scars may be more unsightly than the hair. The type of hair which is often seen near the angle of the mouth in young girls after puberty, in front of the ears, or on the chin is unsuitable for electrolysis and is better treated by bleaching with hydrogen peroxide preparations. It is the stiff and, preferably, straight hair which is most suitable for electrolysis. Two important points are the amount of hair to be treated and the rate of growth, or better, the rate at which at certain ages inconspicuous lanugo hair of the face changes into stiff and unsightly hair. Both factors may be present to such a degree as to make an attempt to remove the hair by means of electrolysis utterly futile. In such cases, the method should not be employed, and, since permanent epilation by means of roentgen rays has proven to be too dangerous to be recommended, methods for temporary epilation should be chosen.

The operator who intends to treat hypertrichosis by means of electrolysis should know beforehand the magnitude of the problem he is undertaking. Successful epilation of a moderate hypertrichosis of the face with the treatment carried out two or three times a week takes several months, that of heavy beards a year or longer depending entirely on the rate of growth, the skill of the operator and — last but not least — the patience of the patients. Unless a physician is prepared to spend the required amount of time and effort which is necessary to bring the undertaking to a successful end he had better refer the patient to a highly specialized physical therapist; it is likely that the latter will carry out the procedure more efficiently and within a shorter time because of his greater skill which enables him to remove a larger number of hairs at each session. But if the physician takes the responsibility upon himself, the patient should be told beforehand how much perseverance and effort, financially and otherwise, will be demanded of her.

(ABSTRACT)

Archives of Physical Therapy, October, 1938

CLINICAL ASPECTS OF THE REACTION OF DEGENERATION

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and

B. Billman, M. D., Columbus, and Cincinnati, Ohio

Electrical stimulation of nerves is a very necessary part of the neurological examination both for therapeutic as well as diagnostic purposes. With a comparatively simple technic one can obtain valuable information regarding certain parts of the nervous system by stimulating various motor nerves and recording individual muscle response.

Electrodiagnosis

Electrodiagnosis depends upon the fact that under normal conditions a definite muscle response is obtained by stimulating the nerve to that muscle.

For therapeutic and diagnostic purposes two types of electricity are used, the galvanic and the faradic currents. When the galvanic current is applied contraction occurs only when the current commences or ceases to flow, that is at the make and break. Nerve fibers are more sensitive to the faradic, while muscle fibers are more easily excited by the galvanic current.

Various stages of the reaction of degeneration exist and can be shown by graphic representation throughout the course of a disease. A muscle with its nerve supply injured may first respond to a galvanic current of 5 M.A.; after a few days it may require 10 or 20 M.A. and finally loses all power of contractibility. The reaction of degeneration may be complete or partial. If complete, the nerve does not respond to either galvanic or faradic current. There are some stages of so-called complete RD in which the muscle responds to the galvanic current. When and if this occurs the strength of the current is great and the reaction obtained is very sluggish. In the partial reaction of degeneration, galvanic and faradic responses are decreased, and there may be inversion of the polar formula.

Complete RD is found in destructive lesions in which the cells of origin of the nerve fibers have been interrupted. These conditions may occur in any of the motor nuclei of the cranial nerves, or in the anterior horn cells of the spinal cord. Diseases of the meninges or spinal roots or any affection of the peripheral nerves may produce a complete RD. The most common of these diseases are anterior poliomyelitis, traumatic and infectious neuritis, and new growths.

In accompanying table of Kovacs shows the faradic and galvanic responses to the various gradations of R. D.

Stages of (RD) Reaction of Degeneration

	Faradic	Galvanic
Normal Reaction..... (Nerve) (Muscle)	Tetanic Contraction	Single brisk contraction
Partial R. D..... (Nerve) (Muscle)	Diminished Response	(Diminished Response) (Sluggish Contraction)
Full R. D..... (Nerve) (Muscle)	No Response	No Response (Sluggish Response)
Absolute R. D..... (Nerve) (Muscle)	No Response	No Response

Electrodiagnosis of Neuroses

There is an entirely different group of conditions in which electrodiagnostic

HISTAMINE IONTOPHORESIS IN RHEUMATIC CONDITIONS AND DEFICIENCIES OF PERIPHERAL CIRCULATION

David H. Kling, M.D., Los Angeles

and

David Sashin, M. D., New York

Kling and Sashin in discussing the technic of histamine iontophoresis state that for an effective technic one must make use of a reliable galvanic apparatus equipped with an accurate milliammeter. The histamine solution is introduced into the tissues by the positive electrode. A padded electrode or strips of block tin or lead foil covered with gauze of adequate size are employed. They find it most economical and hygienic to apply the histamine solution on filter paper to the affected parts over which the well moistened positive electrode is secured by bandages. Formerly, we have used a 1-1000 histamine solution, but we have found a 1-2000 solution entirely sufficient for the treatment of smaller areas (electrodes of the size 4x6 in.) With very large electrodes like those used in the treatment of sciatica, brachial neuritis and circular disturbance of the extremities, a solution of only 1-3000 was found sufficient.

Clinical Results

This study is based on 259 patients with various affections of a neurogenic, vascular, arthritic and rheumatoid character, showing the ration of cure or improvement to failures as being three to one.

Results in 259 Cases of Histamine Iontophoresis

Condition	No. of Cases	Cure or Imp.	%	Not Imp.	%
Vasospastic Conditions	9	7	78	2	22
Buerger's Disease	2	1	---	1	---
Skin Induration After Salvarsan Injection.....	2	2	---	---	---
Myositis	56	46	82	10	18
Subacromial Bursitis	15	15	100	---	---
Tenosynovitis	11	9	82	2	18
Brachial Neuralgia	11	10	91	1	9
Post-Traumatic Arthritis	10	9	90	1	10
Rheumatoid Arthritis	42	30	71	12	29
Gout	4	4	---	---	---
G. C. Arthritis.....	7	5	---	2	---
Osteoarthritis	51	33	65	18	35
Sacroiliac Arthritis	19	7	37	12	63
Spondylarthritis and Radiculitis.....	20	12	60	8	40
Total	259	190	73.3%	69	26.7%

The effect of histamine iontophoresis in affections of soft tissues, bursae and tendons is superior to any other physical measure, yielding from 80 to 100 per cent improvement. In brachial neuritis, 90 per cent have been improved or cured.

In arthritis its effect varies according to the type and the stage of the affection. In post-traumatic arthritis it was invariably successful. In rheumatoid arthritis and in gout it brought relief of pain and a decrease of the periarticular swelling and an increase of motion especially in the smaller joints, in a large

OBLITERATION OF HEMORRHOIDS WITH NEGATIVE GALVANISM

Wilbur E. Keesey, M.D., Chicago

Equipment

The principal appliances needed for this type of operation are:

1. A galvanic generator producing a perfectly smooth current.
2. A large, dispersive, indifferent electrode 4 x 8 inches in size.
3. Large, medium, and small sized Brinkerhoff speculae.
4. A convenient operating table.
5. Specially constructed rectal needle electrodes with short, medium and long tips.

The active needle electrode is a most important factor, because it must deliver the current to the interior of the hemorrhoid.

Technic for Internal Non-Protruding Hemorrhoids

The patient is placed on the table on his left side in Sims' position. The dispersive electrode, having been thoroughly moistened, is connected to the positive pole and placed under the patient's left thigh. The needle in the insulated handle is connected to the negative pole. The speculum is gently inserted to its full length, well above Hilton's line, and the slide withdrawn until the uppermost hemorrhoid comes into view. Slight rotation of the speculum while the patient strains will expose the entire hemorrhoid. The needle electrode is now inserted into the tumor. As before stated, true hemorrhoidal tissue has no sensory nerves, which fact enables the painless insertion of the needle. Genuine hemorrhoid tissue is most often characterized by the brilliant red color of the submucous tissue appearing through a break or erosion in the mucous membrane, but if the mucous membrane is intact the tumor will have a dark violaceous appearance. The needle should be inserted wherever the bright red submucous tissue is observed. Normal mucous membrane is characterized by its pale, pink, translucent appearance and should never be touched with the electrode. The needle is inserted in the uppermost portion of the hemorrhoid, in the longitudinal axis of the vein, and at a very slight angle to the rectal canal. Insertion should be made firmly into the mass to prevent leakage of hydrogen, without, however, touching the opposite wall in order to avoid pain and possible sloughing of the muscularis or mucosa.

From the standpoint of pain and end results a successful treatment demands that the needle point be in the lumen of the vein. The patient is our best guide, for if he complains of burning pain the technic is improper. Anesthesia should be avoided in all cases, because it deprives us of this index. The current is now turned on very gradually, two to three minutes being required to bring the current up to 10 or 15 milliamperes, according to the tolerance of the patient. If in the opinion of the operator proper insertion has been made and there is burning pain, the needle point should be shifted to another angle while in the tissue. Should pain persist following such a manipulation, the current should be shut off and the needle reinserted into a new place. It should always be inserted before the current is turned on, and upon termination of treatment the current should always be slowly turned off before the electrode is withdrawn. A violation of these rules will produce a sudden shock, which, of course, should be avoided. The maximum current tol-

LOW VOLTAGE WAVE CURRENT IN VASCULAR THERAPY

Ernst Bettmann, M.D., New York

Dosage and Indications

With the possibility of regulating both volume and frequency, "electrotherapeutic exercises" can now be carried out. These are applied to the extremities by special electrodes. As the "muscle pump" thus produces massage in a centripetal direction and thereby relieves peripheral tissues apart from the direct muscle exercise, the following indications are given for this mode of treatment:

1. Disturbances of the peripheral vessels, particularly veins, venectasia, varicosities, chronic thrombophlebitis and congestion (frozen feet).
2. Weakness and paralysis of the musculature of the extremity (posttraumatic and postinfectious atrophy, particularly after poliomyelitis).
3. Metabolic disturbances (myogelosis), effusion of joints periarticular swelling and edema. Fatigue (static myalgia due to strained feet).

Cataphoretic histamine and acetylmethylcholin treatment of peripheral circulatory disturbances is rendered more efficacious by subsequent wave current treatment as tissue massage. The treatment of arterial disturbances (arteriosclerosis, thromboangiitis obliterans) which has been extremely furthered by the depressor and pressor method of the "Paevex-therapy" elaborated by Herrmann to create a secondary circulation in vascular derangement, is effectively enhanced by wave current therapy.

The author generally administers treatments from 20 to 30 minutes once every second day to two treatments daily according to the case. Wave intensity and frequency are adapted to the patient. The optimum is one wave every other second or 30 per minute. In some cases of circulatory disturbances (frozen feet, acrocyanosis) wave current therapy was preceded by cataphoresis. Subjectively all patients felt their extremities considerably relieved for several hours or more. The same was experienced in self-experiments (overcoming of fatigue). Objectively a decrease of venous congestion could be proved after the first administrations. There was no longer cyanosis but rather the color of normal circulation. Congestive edema was absorbed more rapidly than with other methods. A decrease of circumference by 1 inch could be seen after a treatment of 30 minutes. Paresthesia and "dead fingers" were favorably influenced. Four non-febrile cases of thrombophlebitis were improved after 4 to 6 carefully dosed administrations. Muscular atrophy was favorably affected in the sense of improved function.

Contraindications to be considered are limited according to our present experience to febrile vascular diseases (phlebitis) and inflammatory diseases of the skin.

ATYPICAL MUSCLE STRAIN

P. Bauwens, M.R.C.S., Eng., Medical Officer in Charge, Electrotherapeutic Department, St. Thomas' Hospital, and Hon. Electrotherapeutist, the Royal Westminster Ophthalmic Hospital; and James K. McConnell, D.S.O., M.C., Lt.-Col. (Rtd.), Biophysical Assistant at St. Thomas' Hospital, London.

The cause of atypical muscle strain is unsatisfactory repair of soft structures due in general terms to ill-health, deficient circulation locally, to chronic local fatigue of muscle, and incoordination. These atypical strains can be located with certainty by simple electrical tests.

These authors in discussing the detection by electrical tests state that hypersensitive areas associated with atypical muscle strain can be conveniently located by two methods. The first is by means of minimal faradism. The second method is to use a current which reaches the damaged muscle without being affected by variations of resistance of the superficial tissues. This is achieved by fully rectifying an alternating current without any smoothing, and controlling it by regulation of the filament current of the rectifying valve. This current being of a unidirectional pulsating nature has an added advantage of being easily measured by means of an ordinary milliammeter.

A satisfactory choice of local remedies often gives results in a single treatment, but to achieve this localization of the site of atypical strain is essential so that the beneficial effect of the treatment is not wasted on other areas. It is of relatively little value to treat an area of referred pain as compared with treating the site of the atypical strain, hence the great importance of the electrical tests in all but the simplest cases.

Two remedies for atypical strain which are generally efficacious are local doses of ultraviolet rays and histamine ionization. The effects of these are somewhat similar because local doses of ultraviolet cause a liberation of small quantities of vasodilatory substances over a long period, producing the characteristic "triple response."

Massage, radiant heat, infra-red rays or diathermy (either short or long wave) often do not succeed, and may even exacerbate the pain. They may, however, prove useful adjuncts to local doses of ultraviolet or to histamine ionization.

ELECTROTHERAPY IN GENERAL PRACTICE

E. P. Cumberbatch, B.M., F.R.C.P.

Three forms of treatment can be conducted by means of the galvanic current.

1. The first is surgical in character. Originally it was called electrolysis but a better name for it is electrochemical cauterization. The method is particularly suitable for the following troubles: A stellate vein (spider naevus) will disappear after a zinc needle, connected to the positive terminal of the battery, is inserted to a depth of two or three millimeters into the central vessel and a current of one milliamperes passed for one minute.

Pedunculated warts, in many cases will gradually shrink and disappear after their bases have been transfixed by a zinc needle and a current of one milliamperes passed for one minute. *Superfluous hairs*, can be safely and permanently removed by platinum needling. Small pigmented *moles* and *port-wine* stains can be treated by zinc needling.

2. The second method of treatment that can be practiced by means of the galvanic current is one in which the current is used for the purposes of effecting the entry into the body of ions possessing therapeutic properties. This form of treatment is commonly known as ionization. The most commonly used ions are those of zinc. Zinc ionization is of value in the treatment of infection and inflammation, with or without ulceration, of mucous membranes. Zinc ionization is probably the most effective treatment for *chronic infective proctitis*. It is of undoubted value in *ulcerative colitis*. Uncomplicated cases of chronic suppurative otitis media can be expected to come to an end after one or two treatments by its means. Cervicitis can effectively be treated by zinc ionization. The same form of treatment is now being used for hay fever and, although it does not procure immunity, it is more successful than other methods in preventing further attacks for the remainder of the season.

3. If the galvanic current is passed through the body by way of a pair of electrodes of the kind previously described as indifferent there is no cauterization of tissue and no entry of therapeutic ions. The current is capable, nevertheless, of bringing about certain therapeutic effects. Long before the introduction of ionization it was known that this current had the power, not only to relieve pain, particularly in cases diagnosed as peripheral neuritis, but also to aid the resolution of inflammation, especially in cases of trauma when the process by natural methods is slow or incomplete. There is therefore a third form of galvanotherapy. It is possible that the current acts by procuring vasodilatation. In the absence of precise knowledge of its mode of action the treatment may be called simply galvanism.

(ABSTRACT)

Radiology, December, 1931, Vol. XVII, P. 1276

**THE RESPONSE OF THE GASTRO-INTESTINAL TRACT TO
EXTERNAL ELECTRIC STIMULATION**

**By Gardner S. Reynolds, M.D., Department of Roentgenology and Physical
Therapy, Henry Ford Hospital, Detroit, Michigan**

1. Electric stimulation of the external abdominal muscles over the barium-filled stomach did not produce, during the time of fluoroscopic observation, any consistent or specific changes in gastric tone or peristalsis.

2. Relatively large amounts of current seemed to decrease peristalsis, while smaller amounts of current seemed occasionally somewhat to increase gastric peristalsis.

3. Electric stimulation over the barium-filled colon produced the following changes:

(a) Ascent and descent of colonic flexures and transverse colon, apparently due to diaphragmatic stimulation, producing a motion of the colon indistinguishable from that occurring in deep diaphragmatic respiration. This was not due to increase of intra-abdominal pressure as the movement was paradoxical, i. e., the colon descended coincidentally with the contraction of the abdominal muscles.

(b) Secondary to this ascent and descent of the colon, an alternate lengthening and shortening of the colon occurred resulting in a to-and-fro movement of the colonic contents, more particularly in the region of the flexures. This, however, was not very striking.

(c) A certain amount of massage effect on the colon was noted, due to the strong contractions of the abdominal muscles.

4. The experiments emphasized the great value of electric stimulation in developing the abdominal muscles. This phase is still insufficiently used on patients for whom active exercise is not advisable and for those who fail to carry out exercise instructions.

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(ABSTRACT)

**GRADUATED MUSCLE CONTRACTION, ITS RATIONALE AND
TECHNIQUE**

**M. Smart in Brit. J. Physical Med., 1933, 8:87; Abst., in Can. Med. Assoc. J.,
31:4:449, October, 1934**

To physiologically sustain tissues, a healthy state of arterial, venous and lymphatic circulation is essential. In damaged tissues this function is even more necessary. Muscle contractions and relaxations are a powerful means of promoting and maintaining this situation in both the muscles and the adjoining tissues. To prevent the formation of adhesions which so constantly follow reparative changes it is necessary to eliminate interstitial oedema and the organization of inflammatory exudate. While effusion into tissues is necessary to repair and is beneficial, it must be transitory and never permitted to stagnate. Not only is the organization of effusion to be feared, but its persistence interferes, because of pressure on nutritional channels, with normal local metabolism and starvation results.

Properly instituted, muscle stimulation functions not only in dissipating oedema in the involved area but it also prevents the formation of adhesions between muscle fibres, between tendons and their sheaths, and also between joint surfaces.

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(ABSTRACT)

CONSERVATIVE METHOD OF TREATMENT OF TRIGEMINAL NEURALGIA

(Preliminary Report)

By Benjamin Ulanski, M.D., Philadelphia, Pa. In Arch. of Phys. Therapy, XVIII; 1:7, January, 1937

The author has been using a certain form of electricity for the relief of pain in various nerve affections. This form of electricity is a modification of the so-called "rapid" sinusoidal current. The rapid sinusoidal current is an alternating current a voltage tracing of which would show as many positive and negative sines as there are cycles per second. Each positive phase is immediately succeeded by a negative phase of equal intensity, therefore, the rapid sinusoidal current displays no polarity effects.

This type of current possesses decided pain relieving qualities. Favorable results obtained with it in sciatica and other forms of neuritis and neuralgia have suggested its application also for trigeminal neuralgia of both the major and minor forms.

Ulanski's first experience was in the case of a man, aged sixty, who had suffered for a number of years, and had various forms of treatment, including operative procedures, without relief. He was at a loss how to give the man relief from his pain, and experimentally applied the rapid sinusoidal current. The result of this procedure was the complete cessation of pain for one year, with a recurrence the following winter. He was then given a few additional treatments, which were followed by another period of relief. Sixty-five other cases have since been treated with only nine failures. The period of relief varied from a few months to three or more years, with immediate response to repetition of treatment on the return of pain. Of these sixty-five cases, the majority were referred by the Neurological and Surgical Departments of the Jefferson Hospital.

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(ABSTRACT)

IONIZATION METHOD FOR THE TREATMENT OF ENDOCERVICITIS

Isador Forman, M.D., Philadelphia, in Am. J. Obstet. and Gynec., 32:3:503, September, 1936

The method of treating the infected cervix by ionization is the most recently adopted procedure in the gynecologic out-patient department of Temple University, namely, ionization of metallic copper in the cervix by means of a galvanic current.

In the past eighteen months we have treated a total of 93 patients and have given 389 treatments. Of these, 71 patients were discharged as completely cured. The patient returns once in two months for a follow-up. There were six complete failures; these patients had a pelvic inflammatory disease with a palpable mass confusing the picture.

Our experience with this method leads us to believe that it approximates, more closely than any other thus far advocated, the ideal treatment for endocervicitis. The deposition of copper as copper oxychloride produces a marked bactericidal effect. The mild coagulating property of the positive current causes a shriveling and obliteration of the infected glands, while the technic of treatment keeps the cervix well dilated, bringing all the mucosa and the openings of the cervical glands in contact with the electrode and, what is more important, permitting adequate drainage.

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(ABSTRACT)

PHYSIOTHERAPY AS AN AID IN NEUROSURGERY

By Winchell McK. Craig, M.D., Section on Neurosurgery, The Mayo Clinic,
Rochester, Minnesota, in *The Physiotherapy Review*,
XIII; 2:53, March-April, 1933

Electrical stimulation of the paralyzed muscles is of value in maintaining a maximal physical condition, if it is applied at the proper time in the convalescence of the muscle or group of muscles.

Probably the most essential underlying principle of massage, contrast baths, whirlpool baths, and all forms of electrical stimulation, is the increase of circulation, and aid in the removal of waste products. For instance, a sinusoidal current is supposed to have some direct action on the metabolism of the muscles, but it has been observed that by adding massage to the application of the current the appearance and nutrition of the part affected has been greatly improved. On the other hand, it has been observed that the use of sinusoidal current in a case in which massage has been given, has been followed by great improvement in circulation. It is possible that those two forms of treatment act somewhat differently and perhaps complement each other.

The application of electricity to denervated muscles varies according to the stage of injury, for during the time that the nerve impulses fail to reach the muscle, galvanic and not faradic current is indicated. Galvanic current is believed to improve the condition of the muscle, both by contraction and by some direct action on its metabolism. Muscle deprived of motor endplates is inhibited by the chemical effect of its waste products, and these are removed through the increased circulation supplied by the galvanic current. This action is also true of the sinusoidal current which improved nutrition and circulation in spite of the fact that contracture of the muscle is not possible.

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(ABSTRACT)

THE VALUE OF IONIZATION IN NOSE, THROAT AND EAR CONDITIONS

By Philip S. Stout, M.D., F.A.C.S., Associate Professor of Otology, Graduate School of Medicine, University of Pennsylvania, Philadelphia, Pa.
In *The Medical World*, 56:1:36, January, 1938

Not many writers speak of the treatment for a suppurative condition of the ears. About a year ago, after the first 50 ears ionized, Stout reported 85 per cent dry ears. Since then he has had something over 50 additional ears to be ionized. On a recent checkup he found 80 per cent dry ears. This is very encouraging when we consider that some of these ears have been discharging over a period of 20 or more years. To stop such a discharge with one or two ionizations is really very gratifying. However, when there are evidences of bone necrosis, cholesteatoma, post-operative mastoid (usually following a radical mastoid operation) with chronic purulent discharge, these and marked granulation tissue in the external canal do not as a rule respond to ionization and should be treated in a different manner.

Ionization is a method of treatment which should be tried in chronic discharging ears before more radical procedures are attempted, unless there is definite reason for the radical procedures. Eight out of ten of the chronic ears will become dry after treatment and remain dry indefinitely in most cases.

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THE ROLE OF PHYSICAL THERAPY IN FACIAL PARALYSIS

By Oliver P. Bourbon, M.D., *the Archives of Physical Therapy*,
May, 1937, Vol. XVIII, pp. 290-295

Some cases of facial paralysis recover spontaneously in a period of time lasting from a few days to a few weeks. It is in the severe attacks, when careful treatment during a considerable period is required to bring about a recovery that is either complete, or so nearly complete that facial disfigurement is not noticeable, that physical measures are especially useful.

After there is a loss of electrical response, treatment by a stimulating electric current has a definite bearing on the regeneration of the nerve without the stimulation of other parts or organs of the body, and without any secondary depressive effect. It probably offers greater therapeutic advantages than drugs, surgery or other forms of physical measures.

Considering the different stimulating currents and their applicability in the treatment of facial paralysis, it is possible to select a current that not only has a stimulating effect on the degenerated nerve and the relaxed muscle tissue, but that also assists in the further removal of waste products and obstruction to muscle action.

It is to be noted that all interrupted currents, whether unidirectional, as the galvanic, or alternating, as the faradic, stimulate the tissue cells and excite muscle contraction, even though it may not be an actual contraction, unless the interruptions or alternations are of too high a frequency. The sinusoidal current has a duration of the whole phase of $1/100$ of a second. This current, then, is useful in that period after the electrical responses have begun to fail and before their failure has become marked. Neither of these currents has its interruptions timed to synchronize with the slow chronoxia of muscles after there is a reaction of degeneration of any great degree.

Since muscle contraction is essential and this takes place only at the make and break of the current, the current must be an interrupted one. In the later stage, after the muscles show a marked loss of electrical response and their chronoxia becomes slower, the time between interruptions must be correspondingly lengthened, usually to a frequency of one to three seconds.

The unidirectional galvanic current fulfills the requirements for a proper regulation of current interruptions to produce muscle contraction with the minimal current strength. The negative galvanic current produces the chemical changes necessary for the stimulation of the tissue cells and the more complete removal of the pathologic conditions that have not already been fully removed. The interrupted galvanic current therefore is an effective treatment for both stimulation and for the removal of waste products, after there is a considerable loss of electrical response.

INTERSTITIAL KERATITIS TREATED WITH ZINC IONIZATION

Samuel M. Edison, M.D., Chicago

Three drops of butyn are instilled in the eye at five minute intervals. The negative pole, thoroughly saturated with saline solution is connected to a pad and fastened to the patient's body. The cloth of the electrode is saturated with a one per cent solution of zinc sulphate and the positive pole of a galvanic battery is attached to the eye electrode and the electrode inserted under the lids. The patient is placed in a recumbent position and the current is turned on, not to exceed four or five ma. for five minutes. The eye is thoroughly irrigated after the treatment, as there is a considerable amount of zinc chloride formed in the conjunctival sac. The reactions from the treatments were never very severe, although a considerable amount of ciliary injection was noticed in all cases.

The local treatment for opacities consists of stimulating methods, such as diionin or mercury ointments and various subconjunctival injections but have been used with little success.

The fortunate part is, that spontaneous clearing of the cornea in the young is very marked. In the real severe opacities, surgery is resorted to in the form of corneal transplants.

1. Inasmuch as the vast majority of parenchymatous keratitis cases are of luetic origin, the diagnosis should in each case be established by a thorough family history and investigation.

2. In hereditary as well as in the adult types, serologic examination should be made and a spinal puncture done if necessary. Tests for tuberculosis should be made to determine sensitization. The chest should be x-rayed.

3. The corneal microscope or slit-lamp will frequently differentiate pathological types of deep keratitis.

4. Although there is a divided opinion as to the efficacy of anti-syphilitic treatments in the hereditary type, it should, nevertheless, be employed in each case with the idea of benefiting the patient in other parts of the body.

5. General treatment, as outlined herein, is of great importance. Tonics, fresh air, proper nourishment, sunshine and a change of climate are of great benefit. The child should be treated with consideration and kindness, should be encouraged and hope for recovery impressed upon him, especially during the prolonged stages of irritation. Bismuth is the drug of choice in hereditary types and in ill nourished children, mercury is tolerated best. In the acquired type arsenicals should be used.

6. Protein shock therapy and artificial fever production are of benefit. Intravenous injections of typhoid H antigen is frequently used.

7. Local treatment cannot be generalized on account of the various pathologic stages. Each phase must be dealt with individually. During the early phases atropin should be used. To promote resolution, stimulating and irritating drugs should be tried, and in the later stages, zinc ionization with the method and electrodes used by the author seems to be of benefit in promoting absorption.

8. If the Mantoux is positive, in spite of the fact that there is a positive Wassermann, a course of tuberculin treatments should be instituted.

USE OF THE GALVANIC CURRENT IN THE TREATMENT OF
ATROPHIC RHINITIS AND OZENA

Joseph S. Stovin, M.D., New York, in Arch. Otolaryng., 25:3:305, March, 1937

The local treatment that has proved most satisfactory to me in the past ten years, both for atrophic rhinitis and ozena, is the use of the galvanic current.

The stimulation of the mucous membrane produced by the galvanic current tends to restore its normal physiologic function. In ozena, even after one or two treatments, there is a disappearance of the foul odor. This treatment of course does not narrow the nasal cavities, but it restores the membranes to a healthier appearance and improves the sense of smell.

The author decided to apply mechoyl by iontophoresis in the nose in a series of patients. Before the galvanic current is applied, the nose is thoroughly cleansed by the wet suction method, a warm physiologic solution of sodium chloride being used. The fluid is run into one nostril, the head being lowered, while the patient says K-K-K, and the return flow is sucked from the other nostril into a suction bottle. The nasal tips are alternated several times during the procedure, so that the nose will be thoroughly cleansed of all mucus and crusts. Each nasal cavity is then packed completely with successive layers of strips of absorbent cotton which have been dipped in the mechoyl solution, care being taken to surround the turbinates as much as possible.

In most cases of ozena, the loss of the foul odor after this procedure is striking. In simple atrophic rhinitis a notable result is the restoration of the sense of smell.

On careful analysis of the results obtained with mechoyl and comparison of them with those observed with the use of physiologic solution of sodium bromide, I am forced to the conclusion that there is no appreciable difference, that mechoyl as a medium is no more effective than sodium chloride and that the benefit derived from this treatment is due to the galvanic current itself.

TREATMENT OF HAY FEVER BY INTRANASAL ZINC IONIZATION

Preliminary Report of 243 Cases

Lionel D. Bailey, C.B., M.C., M.R.C.S., and Clive Shields, B.M., B.Ch., in
British M. J., No. 3980, Page 808, April 17, 1937

In 1936 the opportunity occurred at St. George's Hospital of treating a number of cases of vasomotor rhinorrhoea by intranasal zinc ionization.

During the period under survey 243 cases were treated; these were of both sexes, and the ages ranged from 5 to 77 years. A special analysis of 100 cases showed that 88 per cent were of the seasonal type; 12 per cent were of the non-seasonal variety and presented symptoms of varying severity throughout the twelve months. In only one case of seasonal vasomotor rhinorrhoea was there failure to give a considerable measure of relief; the only complete failures met with were in non-seasonal cases of long standing.

No other treatment for the condition was given except that in a few cases where the secondary reaction was more marked than usual ephedrine, $\frac{1}{2}$ grain, and "sedobrol," 2 tablets were ordered that night. No sprays, douches or local applications were prescribed, and the patient was asked to omit these if already in use.

The following table shows the results obtained:

Complete relief of all symptoms.....	57.6%	}	93.6%
Considerable relief	36.0%		
Some improvement	5.0%		
No improvement	1.4%		

(ABSTRACT)

THE TREATMENT OF HAY FEVER, VASOMOTOR RHINITIS AND
ALLERGIC CASES WITH ZINC IONIZATION

Philip L. Romonek, M.D., F.A.C.S., Omaha, Nebraska M. J.,
22:10:387 (October) 1937

In the author's series of 56 cases, over a period of three years, including cases treated for hay fever, allergy, hyperaesthetic and vasomotor rhinitis, I can report the following results.

Complete relief	48 cases or 85%
Less than 50% relief	6 cases or 12%
No relief	2 cases or 3%

1. Allergic group, 9 cases.

8 patients with very good results or 88%.

1 patient with no relief or 12%.

Romonek considered a case "complete relief" when the sneezing and lacrimation stopped, the nasal swelling was reduced, and the profuse discharge dried up. Relieving the hay fever in many of my cases has also relieved the asthma associated with the hay fever.

Zinc iontophoresis is suggested for the failures after trying the serum and other treatments. He also believes that it is to the advantage of the patient to have as few treatments as possible in order to secure results. The author uses only two treatments to the nose, one on each side. This certainly is much preferred to twelve or more treatments as given with other methods.

In adults, he treats one nasal cavity at a time. There is considerable reaction the first night and he has found that the patient appreciates this consideration. He always comes back for the other side because he feels so much better from his first treatment that he will return for the second treatment a few days later.

(ABSTRACT)

IONTOPHORESIS OF VARICOSE ULCERS

Joseph Kovacs, M.D., Instructor in Medicine, New York Post-Graduate Medical School and Hospital of Columbia University, New York.
In Arch. Phys. Therapy, XVIII; 2:103, February, 1937

In this paper we present the cumulative record of our work with 54 cases, which include the nine reported before the Section on Pharmacy and Therapeutics of the American Medical Association, and the 26 cases published in 1936.

During the period of treatment no patients were hospitalized or put to bed, but were urged to continue their daily occupations, which ranged from heavy manual to routine office work.

No other form of treatment, such as injections, was used during the course of the iontophoresis. A plain petrolatum dressing was permitted during the early stages of the treatment, if it made the patient more comfortable. Veins, if indicated, were injected only after the ulcer had healed.

A standard 0.5 per cent solution of acetyl-beta-methyl-choline chloride is used. Reinforced asbestos paper is saturated with the 0.5 per cent solution of the drug and wrapped around the foot and leg as high as the knee. The ulcerated area is not covered until it is healed or covered by a firm crust. After this has occurred, the application may be made directly over the healed area also. A malleable metal plate is placed over the wet asbestos paper and connected to the positive pole of a galvanic machine. The metal plates are never applied over the ulcerated area. A large, regular, moist pad electrode is used as a dispersive electrode. This is placed under the back and connected with the negative pole. The current is turned on and slowly increased to 20 or 30 milliamperes. At the end of the treatment the current is slowly reduced and turned off. Treatment is given in some cases daily, but generally two or three times weekly, from twenty to thirty minutes.

Fifty-four cases of chronic ulcer have been treated by this method. Of these there are 11 cases still under treatment. Of the 43 completed cases only two did not show satisfactory results.

CHRONIC SUPPURATIVE OTITIS MEDIA

By Abram H. Persky, M.D., F.A.C.S., Philadelphia, Pa., in Arch. Ped.,
LIV; 7:425, July, 1937

Zinc ionization has been accorded a considerable amount of attention recently and, in ideal cases, has produced almost miraculous results in that many an old persistent discharge that has resisted the usual treatment may become completely dry after one treatment. This treatment is most successful when, first, there are no granulations or polypi present in the canal or protruding through the tympanic membrane, and, secondly, where the perforation in the tympanic membrane is large. Where the perforation is small it may be necessary to enlarge it. However, it is contraindicated where there are evidences of an acute mastoiditis. Briefly, the technic is as follows:

The ear canal and tympanic cavity are emptied as thoroughly as possible of all pus. Then, a few drops of 10% cocaine hydrochloride, with equal amounts of adrenaline hydrochloride 1-1000 solution, are instilled into the ear canal. The head is tilted with the diseased ear upward, and, after a few minutes, the ear is thoroughly wiped dry, and the entire ear canal is filled with 0.25% zinc sulphate in water to which a few drops of glycerine have been added. Then a specially insulated ear speculum is inserted into the ear canal. The positive electrode of the galvanic current is connected to the ear speculum while the negative electrode is applied to an arm or leg. The galvanic current is turned on very slowly, but should not exceed two or three milliamperes. This exposure should be continued for eight to ten minutes then gradually reduced and finally turned off. The after-treatment is simple. Do not dry the ear, but merely insufflate a little dry boric acid powder into the canal.

OBSERVATIONS ON THE USE OF ACETYL BETA METHYLCHOLINE CHLORIDE IN CHRONIC ARTHRITIS

By Douglas Boyd, M.D., Stafford L. Osborne, B.P.E., and David E. Markson, M.D., F.A.C.P.

They used a vacuum tube rectified direct current which gave a fairly smooth galvanic current. The active electrode consisted of an asbestos fabric (resistant to tears) saturated with a 1 per cent solution of acetyl beta methylcholine chloride. Lower concentrations of the drug were tried, but they did not obtain satisfactory reactions with less than a 1 per cent solution. Kotkis and his associates, working with dogs, reported no difference in drug effect with 1-1000, to 1-8000 solutions. They did, however, cover a relatively larger percentage of the skin area but did not mention the effect of stronger (1-100) solutions. Boyd and Osborne found a decided difference between the reactions obtained with a 1-100, and with a 1-200 solution. The weaker solution gave none of the clear-cut reactions. The saturated fabric was wrapped in close contact about the part to be treated, and then a metal foil strip, three-eighths of an inch in width, was wound spirally about the saturated paper. This metal strip was used to conduct the galvanic current evenly over the whole area. The positive pole of the galvanic current source was connected to the distal end of the metal strip. The negative pole of the machine was connected to the patient's back by means of a large dispersive electrode, 10" by 12" in size. This completed the circuit. The strength of current and the time of the current flow regulates the effectiveness of the ionization. Individual tolerance to the treatment guided them somewhat in the current strength, but they were usually able to give 40 to 50 milliamperes for 20 minutes after the first treatment. When the treatment was started, the current strength was gradually raised until the desired milliamperage was reached. Sudden increases should be avoided. At the end of treatment, the current intensity was gradually reduced until no current flowed. Following treatment the patient should remain quiet and warm for 30 to 60 minutes and then be allowed to resume his usual activities. When many joints are involved they found it better to concentrate treatment on one joint or limited area,—such as the hand. The most satisfactory interval between treatments appeared to be three or four days. The therapeutic effects on patients were studied after five, 10, 15, and 20 to 25 treatments. As a result of this check, they found the maximum effect was achieved after 18 to 20 treatments.

Twenty-two cases of arthritis were treated by these authors with acetyl beta methylcholine common ion transfer. Eight of 14 patients whose hands were treated showed an increased flexibility in function and usefulness in these hands. Pain was relieved in some cases. Muscular fatigue was markedly relieved in almost all cases adequately treated. Increased endurance was experienced by those completing the course of treatments.

Patients with circulatory disturbances of the extremities; those with cool, pale, moist, and often cyanotic hands and feet gained most from treatment.

Maximum effects were gained after a series of 18 to 20 treatments.

NEWER TREATMENT OF ARTHRITIS AND SIMILAR CONDITIONS

By Jerome J. Bredall, M.D., Perryville, Mo. In The Journal of the Missouri State Medical Association, 35:5:164, May, 1938

The object of this paper is to introduce an additional procedure in the treatment of arthritis. This method of treatment is not a cure-all and should be used as an adjunct to other recognized therapy; namely, rest, removal of foci of infection, corrected diet, orthopedic corrections, correction of metabolic irregularities and endocrine disturbances, massage, heat, diathermy and various medications.

A .1 per cent or a 1:1000 solution of mecholyl, an alkaloid, is introduced into the affected part from the positive electrode. Absorbent paper, sheet wadding, reinforced asbestos fabric paper or cotton filled bandage is saturated with the solution and wrapped around the part to be treated. On top of this a tin lead plate or strip is wrapped around the part and connected with the positive pole of the galvanic machine. A large, regular moist pad electrode is placed under the back or over the abdomen and connected with the negative pole. The current is gradually increased to from 20 to 30 minutes. Then the current is slowly turned off, electrodes removed, parts dried and wrapped. There may be a slight tingling sensation under the electrodes during the treatment but the current strength must always be within comfortable toleration of the patient.

Treatments are given every day at first and the intervals between treatments gradually lengthened until they are given every week or two.

The degree of concentration of mecholyl in solution within limits from 1:200 to 1:8000 does not seem to influence the physiologic effects produced. However, the rapidity of action and duration of effect can be fairly well controlled by the amount and duration of current applied.

The general physiologic action of mecholyl can at once be removed by the hypodermic administration of atropine. I have never had to use this antidote at any time.

INTERNAL HEMORRHOIDS: TREATMENT
BY NON-SURGICAL METHODS

Rufus C. Alley, M.D.

Alley states in discussing the technique of Electrolysis with Negative Galvanism that Droste has had a large experience with galvanic treatment over a period of nineteen years and that he uses his technic. The patient is placed in the left lateral position and a wet pad attached to the positive pole of the generator, is placed under the left hip. The body weight aids in securing good contact, an advantage lost when the pad is placed over the abdomen. The internal hemorrhoid is exposed by a Brinkerhoff speculum and injected with 0.3 to 1 cc. of an anesthetic solution. The electrode used is insulated excepting at its pointed end of which about one centimeter, or slightly less, is exposed. It is held in a slender holder about eight inches long, by a knurled chuck. To the upper end of this holder is attached the wire leading to the negative pole of the generator. The electrode is pushed into the hemorrhoid until the exposed portion is completely buried, the long axis of the electrode being held parallel to the long axis of the speculum. The current is then slowly turned on. When the patient notices a slight discomfort (tingling or burning) either in the rectum or on the hip, the strength of the current is slightly diminished. The electrode is now held in place from five to fifteen minutes, while the current gradually produces discoloration of the pile — at first grayish or purplish, progressing to black. This discoloration extends in all directions from the point of puncture and forms an areola somewhat over a centimeter in diameter. Thus, two or three applications may be required in a large internal hemorrhoid. This procedure is repeated on each hemorrhoid, the entire treatment lasting from thirty to forty minutes in the average case.

As with the injection methods one must studiously avoid the sensitive anal canal and limit the treatment strictly to the internal variety of hemorrhoids which are covered with rectal mucous membrane. Non-surgical treatment of hemorrhoids has been condemned by a few surgeons whose opinions must be respected. It is sometimes claimed that the method is not safe because of the likelihood of producing thrombosis and embolism. Infection with sloughing, abscess formation and even septicemia are said to be potent dangers. The consensus of opinion among conservative proctologists does not seem to support these statements.

PERIPHERAL NERVE LESIONS: DIAGNOSIS AND TREATMENT

Benjamin Boshes, M.D.

Electrical Examination

A muscle is stimulated chiefly through its nerve supply, especially if the electrode is applied over the motor point, the point of entry of the nerve into the muscle. When the nerve is severed the altered response to the electrical stimulation results in the "reaction of degeneration (R. D.)." The excitability of the nerve for the faradic and galvanic current is abolished. The muscle loses its excitability for the faradic current. In the first two weeks it is hyperexcitable to the galvanic current. Then this excitability is diminished so that more current is necessary. The character of the response is altered. The fibrillary elements respond with a brisk twitch, even to faradism. When these are gone, only the sarcoplasm remains. This responds solely to the galvanic current, and then with a slow contraction and relaxation. The loss to faradism appears in two weeks. The best indication of the reaction of degeneration is the slow contraction of the muscles. Partial lesions result in diminution to these currents. At the end of twelve to twenty-four months, in a complete lesion, all responses disappear. A normal muscle responds best at its motor point; a degenerated muscle best by direct stimulation of all its fibers; therefore, a current passing longitudinally through a muscle evokes the best response. This gives the so-called "reaction at a distance" and may be used the first six months after injury. It generally requires less current than direct stimulation.

Electrotherapy

This is designed to prevent atrophy of muscles and fibrosis, to increase nutrition, and to conserve the functional capacity of the paralyzed muscle until sufficient nerve regeneration has taken place to permit of active motion. Quite a controversy has raged for years in neurologic circles as to the efficiency of such treatment. The weight of the evidence, particularly clinical, would indicate that electrotherapy, properly administered, results in decreased atrophy and possibly a more advanced type of nerve regeneration. Stimulation of a muscle by electricity results in a contraction. This activity preserves the bulk of the muscle and prepares it for voluntary movement. Obviously, if the faradic current produces no contraction, the galvanic must be used as such or as a sinusoidal current. The fact that the galvanic current produces a single quick twitch is no contraindication for its use. Such contractions are safe two weeks after the injury or surgical procedure. Before this time the muscle is fragile and bruises easily — or the suture-line of the nerve may give. Since galvanic current is occasionally painful, sinusoidal current is of advantage in treating children and sensitive people. Prolonged stimulation with continuous current is useless because contraction occurs only at make and break. During the first few months after injury, while the muscles are hyperirritable, unipolar stimulation will produce contraction in the muscles most affected by the weak currents because of "longitudinal stimulation." One must not fatigue these muscles. The patient frequently cannot tell because his deep muscle sense may be defective. Later bipolar stimulation may be used because the unipolar may now produce contraction in healthy muscles, injuring the weak.

Because of the frequency of polar inversion, the positive, less painful pole